

Lukas Heumos

Curriculum Vitae

Education

- 2018–2020 **Master of Science Bioinformatics**, *Eberhard Karls Universität Tübingen*, Tübingen, 1.37 - ongoing.
- 2015–2018 **Bachelor of Science Bioinformatics**, *Eberhard Karls Universität Tübingen*, Tübingen, 1.79.

Masters's Thesis

- Title *GPU reproducible end-to-end machine learning*
- Supervisors Dr. Sven Nahnsen (Director Quantitative Center for Biology), Professor Dr. Philipp Hennig (Max Plank Institute for Intelligent Systems, University of Tübingen)
- Description Investigation of GPU based determinism of major machine learning frameworks and development of a best practices framework based on mlflow. In progress.

Experience

Activities

- 01.11.2019– **iGEM Tübingen Advisor**, *Tübingen*.
- 01.11.2020 Advising the iGEM Team Tübingen, project development, teaching bioinformatics and software engineering.
- 28.06.2020– **Lindau Nobel Online Science Days**, *Virtual*.
- 01.07.2020 Talks and discussions with nobel laureates.
- 19.06.2020– **Lindau Nobel Sciathon**, *Virtual*.
- 21.06.2020 Examining similarities and differences between the COVID-19 pandemic and climate change.
- 05.04.2020– **COVID-19 Virtual Biohackathon**, *ONLINE*.
- 11.04.2020 SEIR modelling of COVID-19 infections; discriminating feature detection across different SARS-Cov2 sequences; nf-core coordinator for gene expression based global infection analysis
- 27.03.2020– **Hackzurich, ETH Zürich**, *VIRTUAL*.
- 30.03.2020 Agent-based modelling of COVID-19 infections in Switzerland
- 04.03.2020– **nf-core hackathon**, *FRANCIS CRICK INSTITUTE LONDON*.
- 06.03.2020 End-to-end machine learning with nextflow and proteomics nextflow pipelines
- 19.02.2020– **AI hackathon**, *HELMHOLTZ AI MUNICH*.
- 21.02.2020 Machine learning for improved cancer differential diagnosis by multi-level MALDI imaging molecular-morphological data

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- 01.12.2018– **iGEM Tübingen team member**, TÜBINGEN.
 01.11.2019 Team leading, finance (raised more than 15000€), web development, bacterial RNA-Seq data analysis, metabolic modelling and development of a machine learning based cell-penetrating peptide efficacy predictor.
 08.04.2019– **nf-core hackathon**, TÜBINGEN.
 10.04.2019 Implementation of Nextflow pipelines for label-free proteomics data and GUIDE-Seq data.
 01.12.2017– **iGEM Tübingen team member**, TÜBINGEN.
 01.11.2018 Homology modelling, molecular dynamics simulations, development of a machine learning based deimmunization workflow.

Vocational

- 03.2018– **Software Developer and Scientific Support**, QUANTITATIVE BIOLOGY CENTER today (QBIC), Tübingen.
 Software development of libraries, tools and portlets. Design and development of a containerized large-scale machine learning infrastructure based on Apache Spark. GUIDE-Seq data analysis.
 08.2016– **TOEFL Test Administrator and Team Leader**, TOEFL TEAM TÜBINGEN, today Tübingen.
 Leading the student based TOEFL Team Tübingen and supervising TOEFL tests.
 02.2016– **Systems Administrator and Scientific Support**, PALEOGENETICS GROUP OF 08.2018 PROF. DR. DR. VERENA SCHÜNEMANN, Tübingen.
 Maintained the computational infrastructure and provided scientific bioinformatics support.

Teaching

- 15.04.2020– **Teaching Assistant for Biomedical Data Management Seminar**, UNIVERSITY 24.07.2020 OF TÜBINGEN, QUANTITATIVE BIOLOGY CENTER, Tübingen.
 Supervising master students in a seminar about commercial clouds in biomedical research.
 03.09.2019– **Bioinformatics and Lab Course**, EXPERIMENTA SCIENCE CENTER, Heilbronn.
 06.09.2019 Introduced DNA, sequencing, CRISPR-Cas9, bioinformatics, project development and management with applied sessions to high school students.

Awards and Honors

- 2020 Nominated by the University of Tübingen to attend the interdisciplinary 70th Lindau (postponed to 2021) Nobel Laureate Meeting and accepted by the Lindau Meeting Council
 2019 Invited by New England Biolabs to meet Nobel Laureate Richard J. Roberts in Ipswich, USA
 2019 iGEM bronze medal for iGEM Team Tübingen 2019
 2019 Bestowed 'Award for Exceptional Student Commitment for iGEM Tübingen' by the University of Tübingen
 2018 iGEM silver medal for iGEM Team Tübingen 2018
 2015-2019 e-fellows scholarship
 2015 9th out of more than 1000 teams in German Founders' Prize for Students competition
 2014-2016 Professional Starcraft 2 player

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Computer skills

Basic	R, BASH, APACHE SPARK, SINGULARITY
Intermediate	L ^A T _E X, WEB DEVELOPMENT, MACHINE LEARNING, DOCKER, C++, MLFLOW
Advanced	PYTHON, NEXTFLOW, JAVA, LINUX

Talks

- 10.2019 On 'GLP.exe' (iGEM Tübingen project 2019) in Boston, USA, at the Giant Jamboree
- 04.2015 About 'Gloready' (German Founders' Prize for Students project) in Stuttgart and Hamburg at the Landesbank Baden-Württemberg Sparkasse and the grand finals

Languages

German	Mothertongue
English	Fluent
French	Intermediate

Publications

1. Lamsfus-Calle*, A., A. Daniel-Moreno, G. Urena, J. Rottenberger, J. Raju, T. Epting, S. Marciano, **L. Heumos**, P. Baskaran, J. S. Antony, R. Handgretinger, and M. Mezger. "Universal gene correction approaches for β -hemoglobinopathies using CRISPR/Cas9 and AAV6 donor template delivery". In: *Submitted* (2020)
2. Lamsfus-Calle, A., A. Daniel-Moreno, J. S. Antony, T. Epting, **L. Heumos**, P. Baskaran, J. Admard, N. Casadei, N. Latifi, D. M. Siegmund, M. S. D. Kormann, R. Handgretinger, and M. Mezger. "Comparative targeting analysis of KLF1, BCL11A, and HBG1/2 in CD34+ HSPCs by CRISPR/Cas9 for the induction of fetal hemoglobin". In: *Scientific Reports* 10.1 (June 2020), p. 10133. ISSN: 2045-2322. DOI: 10.1038/s41598-020-66309-x. URL: <https://doi.org/10.1038/s41598-020-66309-x>
3. Ferrarini, M., V. Aguiar-Pulido, E. T. Dawson, A. Guarracino, A. Gruber, **L. Heumos**, A. Kanitz, A. Lal, B. E. Pickett, R. Rebollo, and et al. "Global analysis of human SARS-CoV-2 infection and host-virus interaction". In: *BioHackrXiv* (May 2020). DOI: 10.37044/osf.io/b4zkp. URL: biohackrxiv.org/b4zkp
4. Ballesio, F., A. H. Bangash, D. Barradas-Bautista, J. Barton, A. Guarracino, **L. Heumos**, A. Panoli, M. Pietrosanto, A. Togkousidis, P. Davis, and et al. "Determining a novel feature-space for SARS-CoV-2 sequence data". In: *BioHackrXiv* (May 2020). DOI: 10.37044/osf.io/xt7gw. URL: biohackrxiv.org/xt7gw
5. Bichmann, L., A. Nelde, M. Ghosh, **L. Heumos**, C. Mohr, A. Peltzer, L. Kuchenbecker, T. Sachsenberg, J. S. Walz, S. Stevanović, H.-G. Rammensee, and O. Kohlbacher. "MHCquant: Automated and Reproducible Data Analysis for Immunopeptidomics". In: *Journal of Proteome Research* 18.11 (2019). PMID: 31589052, pp. 3876–3884. DOI: 10.1021/acs.jproteome.9b00313. eprint: <https://doi.org/10.1021/acs.jproteome.9b00313>. URL: <https://doi.org/10.1021/acs.jproteome.9b00313>

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6. Widerspick, L., **L. Heumos**, B. Nowack, and A. Abbasi. "Junge Molekularbiologie-Teams kreieren faszinierende Innovationen". In: *BIOspektrum* 25.7 (2019), pp. 796–797. ISSN: 1868-6249. DOI: 10.1007/s12268-019-1092-0. URL: <https://doi.org/10.1007/s12268-019-1092-0>

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